



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office  
9721 Executive Center Drive North  
St. Petersburg, Florida 33702

August 16, 2000

Rec'd  
21 AUG 2000  
JSC

Colonel Joe R. Miller  
District Engineer, Jacksonville District  
Department of the Army, Corps of Engineers  
Regulatory Division, South Permits Branch  
P.O. Box 4970  
Jacksonville, Florida 32232-0019

Dear Colonel Miller:

The National Marine Fisheries Service (NMFS) has reviewed your staff's letter dated July 18, 2000, regarding permit application number 200000380 (IP-DSG). The applicant, Town of Palm Beach, proposes a renourishment of approximately 10,032 feet of beach shoreline of the Atlantic Ocean at Phipps Ocean Park Beach, Palm Beach County, Florida. The NMFS provided previous comments and requested additional information by letter dated April 14, 2000.

Pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), the South Atlantic Fishery Management Council (SAFMC) has identified EFH in the project area for species they manage including shrimp, the snapper-grouper complex (containing ten families and 73 species), Spanish and king mackerel, coral, and coral reef communities, and spiny lobster. The NMFS has identified EFH for highly migratory species that include billfishes and species of sharks that inhabit this area, such as nurse, blacktip, sandbar, lemon, and bull sharks. Likewise, the Mid Atlantic Fishery Management Council has identified EFH for bluefish that includes pelagic waters in the project area, from the coastline to well beyond the construction limits for this project. Various life stages of some managed species found in the project area include larvae, postlarvae, juvenile and adult stages of red, gray, lane, schoolmaster, mutton and yellowtail snappers; scamp; speckled hind, red, yellowedge and gag, groupers; Spanish and king mackerel; bluefish; white grunt; and spiny lobster.

In addition to EFH for Federally managed species, hard bottom, coral, and shallow nearshore habitats provide nursery, foraging, and refuge habitat for other commercially and recreationally important fish and shellfish. Species such as blue crab, shrimp, flounder, red drum, pompano, snook, striped mullet, tarpon, and a variety of reef fish and tropical fish are among the many species that utilize this habitat. Several of the species listed above are identified as being of "national economic importance" as identified pursuant to Section 906(e)(1) of the Water Resources Development Act of 1986 (PL 99-602), and therefore, are aquatic resources of national importance (ARNI). These include blue crab, shrimp, snappers, red drum, bluefish, Spanish and king mackerel, pompano, tarpon, and flounder. In accordance with Part IV, Section 3(a) of the current Memorandum of Agreement between the



~~Determined by Commerce and the Army, the proposed project may result in substantial and unacceptable impacts to EFH.~~

Categories of affected EFH include marine water column (including pelagic waters), live/hard bottoms, coral, coral reefs, and artificial/manmade reefs. The SAFMC has identified EFH Habitat Areas of Particular Concern (HAPC) which occur within the project area. HAPCs are subsets of EFH that are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. Offshore areas of high habitat value or vertical relief, and habitats used for migration, spawning, and rearing of fish and shellfish have been included within HAPC. Specifically, categories of HAPC in the vicinity of the proposed project include hermatypic coral habitat and reefs, and hard bottom habitats.

It is the NMFS assessment that ~~this project will adversely affect EFH for federally managed species and HAPC, as well as habitat for other important living marine resources. Impacts from this project will occur within at least three spatial categories: offshore borrow areas, pipeline corridors, and nearshore fill areas.~~

#### Offshore Borrow Areas

~~Benthic communities are impacted by dredging operations in at least three ways: 1) mechanical disturbance, 2) sedimentation, and 3) turbidity.~~ Mechanical impacts occur when dredge equipment such as dredge heads, cables, or barge anchors crush, break, dislodge, or remove benthic resources. Siltation and sedimentation impacts occur when sand and silt, re-suspended into the water column from the dredge and fill operation, settle-out over reefs and hard bottom habitats. Turbidity, or resuspension of sedimentation in the water column, causes a decrease in water clarity and light penetration and can have a long residence time (from weeks to months) after the termination of dredging (Goldberg 1989).

The mosaic nature of hard bottom habitat in southeast Florida increases the probability that impacts may occur during dredging operations. ~~At least three sand borrow areas have been identified within and adjacent to the project area: Palm Beach, in 1971-1972 and 1979 (Courtenay *et al.* 1974, 1980); Palm Beach in 1977-1978 (Marszalek 1981); Sunny Isles in 1988 (Blair *et al.* 1990a); and Palmetto in 1990 (Blair *et al.* 1990b).~~ In the 1988 Sunny Isles project, post-construction investigations revealed that the dredge cutter head had inadvertently impacted 2.2 acres outside the borrow area; including an estimated 1.5 acres of benthic hard bottom habitat. Over 25,000 hard coral colonies, 24,000 soft coral colonies and over 2,000 barrel sponges were destroyed by the dredging equipment. Acute angles, or "dog-legs," in the borrow site boundaries and inadequate buffer zones contributed to the adjacent hard bottom impacts (Blair *et al.* 1990a).

The impacts to the sand borrow areas and their associated macro-invertebrate communities from the dredging operation may be more extensive and long-term than has been suggested in assessments for previous beach nourishment projects (USACE 1996). These studies have concluded that perturbations within borrow areas are negligible due to rapid re-establishment of the infaunal communities. However, re-examination of data from borrow areas and reference areas of four beach renourishment projects on the southeast Florida coast, found that changes to the infaunal community structure may persist for 2-3 years or more (Wilber and Stern 1992). Other studies have shown a decrease in diversity and abundance of the infaunal community in borrow areas several years following the

dredging (Turbeville and Marsh 1982; Goldberg 1989). The impact that such projects have on macro-invertebrate communities should be considered as significant because they are either directly, or indirectly, a major portion of the diet of many fish and macrocrustaceans (Baird and Ulanowicz 1989).

Siltation can be detrimental to the growth and survival of reefs and the majority of associated species, especially filter-feeding organisms such as hard corals, sponges, and soft corals. Other organisms such as algae, crustaceans, and fishes also can be adversely affected (Dodge and Vaisnys 1977; Bak 1978; Marszalek 1981; Goldberg 1989; Nelson 1989). Suspension of sediment has been shown to cause mortality of eggs and larvae of marine and estuarine fish (Newcombe and Jensen 1996) and a reduction in feeding in juvenile and adult fish also can be expected. Reduced feeding success may influence survival, year-class strength, and recruitment of juvenile fish that inhabit nearshore hard bottom and coral reef habitats (Wilber and Clarke, draft manuscript). Sediment damage to hard bottom and coral reefs have been documented at John U. Lloyd State Park (Britt and Associates 1979) and the Bal Harbor project in 1990 (Blair *et al.* 1990b). Post-construction surveys conducted for the Bal Harbor project revealed that a total of 24.8 acres of hard bottom reef habitat was impacted by sedimentation, with sediment depths of 1-5 inches. The report estimated that over 53 percent of the hard coral colonies were killed by sedimentation, equivalent to the loss of 18,279 colonies. Inadequate buffer zones surrounding the borrow areas contributed to the impacts in this project (Blair *et al.* 1990b).

Turbidity impacts are chronic perturbations that cause long-term reductions in primary and secondary productivity of reef and hard bottom communities by reducing water clarity and light penetration. Seven years after the completion of the 1971 Hallandale project, persistent turbidity resulted in visibility of less than 2 meters in the nearshore areas (Courtenay *et al.* 1980). Elevated turbidity levels near hard bottom and coral reef habitat is particularly detrimental to photosynthetic organisms such as corals and algae (Dodge and Vaisnys 1977; Bak 1978), and filter feeding organisms, such as sponges and tube worms (Hay and Sutherland 1988). Experimental studies have demonstrated that hard corals are adversely affected at levels below the current Florida administrative threshold of 29 NTUs (Teleniski and Goldberg 1995a; 1995b). In the Bal Harbor project, for example, the turbidity levels were seldom over 3 NTUs, yet 1-5 inches of sediment were deposited over 24.8 acres of hard bottom (Blair *et al.* 1990b).

The distance that sediment plumes may extend from the dredge depends upon the type of dredge, the operator, currents, and sediment type. Sediment plumes have been documented to travel along the bottom for some distance away from the dredge. For example, elevated sediment levels were recorded 1,100 feet from the borrow area in the 1990 Bal Harbor project, and were estimated to continue up to 1,200 feet (Blair *et al.* 1990b). Blair *et al.* (1990a), in their report of the Sunny Isles project, recommended a 1500 foot buffer when the silt content of the borrow site is 5-9%. According to the Town of Palm Beach Offshore Sand Source Investigation document dated March 2000, the silt content of proposed Borrow Area III in the Phipps Ocean Park Beach project is 1.93 to 3.46% (Coastal Planning & Engineering, Inc.). Goldberg (1989) suggested that the minimum distance between the hard bottom area and the borrow site should be the mixing zone dimensions around the dredge head. Since the mixing zone around the dredge is typically 450 feet or more, a buffer zone around the borrow area less than this will likely cause impacts to hard bottom reefs.

Information provided from the applicants agent (Coastal Technology Corporation) by letter dated June 30, 2000, indicated that the dredge operation will be conducted using a cutterhead dredge, with a buffer zone of 200 feet between the dredge area and the nearest hard bottom reef. The NMFS is concerned that impacts from the dredge operation may impact adjacent hard bottom and coral communities. Although the likelihood of mechanical impacts to the hard bottom reefs are reduced when even modest buffers are utilized, impacts from siltation and persistent turbidity are a much greater risk. Video transects surveys of the areas adjacent to Borrow Areas III and IV, dated June 13, 2000, indicated the presence of a considerable amount of well-developed, medium to high relief hard bottom and coral reef habitats east of these two sites. According to the transect (Figure 1) map provided, some of these reefs appear to be located less than 200 feet from the limits of the proposed Borrow Area III.

#### Pipeline Corridors

Pipeline damage to hard bottom reefs can be expected from mechanical damage (crushing and scraping) from the pipeline itself, as well as from anchors holding the pipeline in place and cables attached to buoys marking the pipeline. Some impacts to macroalgae and soft and hard corals can be expected from shading, as well. Impacts can, however, be reduced by elevating the pipe a few inches off the bottom using collars or connector rings on the pipeline. Although relatively rare, breaches in pipelines have been documented in past south Florida beach renourishment projects. A 1999 project in North Miami Beach resulted in over 1,000 cubic yards of sand being deposited over a reef that was crossed by the pipeline. All benthic organisms within an area of approximately 4,000 square feet were reported to have died due to the placement of at least one inch of sand on the reef (R. Mulcahy, personal communication).

#### Nearshore Fill Areas

The proposed renourishment project encompasses 1.9 miles of beach shoreline and will bury an estimated 5.17 acres of nearshore hard bottom. These nearshore hard bottoms are extremely diverse habitats and the high abundance of organisms found there is important to nearshore fishes. In a relatively modest sampling effort, Nelson (1989) found a total of 325 plant and animal species on subtidal rock outcrops at Sebastian Inlet Harbor. Algal species (62), represented the most speciose group in his study. A study conducted in Indian River County, reported 109 species of benthic algae growing on nearshore reefs off Vero Beach, Florida (Juett *et al.* 1976). Other studies have documented the high diversity associated with nearshore hard bottom habitats (Gore *et al.* 1978; Vare 1991; Nelson and Demetriades 1992). Because many organisms associated with nearshore hard bottom habitats are sessile and have no ability to burrow up through the sediment, the survivability of these communities after renourishment is minimal (Dodge and Vaisnys 1977; Marzalek 1981). The loss of primary production within the area of the fill placement eliminates an essential foraging resource for juvenile fish, turtles, and invertebrates.

The nearshore hard bottom reefs serve as settlement habitats for immigrating larvae of fish and invertebrates or as intermediate nursery habitats for juveniles emigrating out of nearby inlets (Vare 1991; Lindeman and Snyder 1999). At least eighty-six taxa of fish have been quantified among nearshore hard bottom habitats along southeast mainland Florida; including at least 34 species of

juvenile reef fish which may utilize these habitats as nursery areas (Lindeman and Snyder 1999). Gilmore and Herrema (1981) recorded 107 species of fish from the littoral and sublittoral surf zone reefs of central-east Florida.

Green, hawksbill, leatherback, and loggerhead sea turtles are all known to utilize Palm County beaches and nearshore habitats for nesting, foraging, and resting, and are protected by the NMFS and U.S. Fish and Wildlife Service under the Endangered Species Act of 1973. Environmental assessments completed for past beach renourishment projects have limited their discussion of sea turtles to the impacts on nesting habitat (USACE 1996). However, several studies have determined that nearshore hard bottom habitats along the southeast Florida coast are important as nursery habitat for juvenile green turtles and loggerheads (Guseman and Ehrhart 1990; Wershoven 1992; Carson, in press). These studies have concluded that juvenile and adult turtles feed upon the large biomass of macroalgae available on these nearshore hard bottom habitats.

#### Mitigation Reefs

A revised mitigation proposal, dated June 22, 2000, was submitted in conjunction with other previously requested information. The proposed mitigation for the burial of 5.17 acres of nearshore hard bottom habitat consists of construction of artificial reefs at a 1:1 mitigation ratio. Two reefs are proposed: one 1.57 acre, "resilient" mitigation reef located in water depths of -8 to -13 feet NGVD and constructed from limestone boulders; and one 3.60 acre, "ephemeral" mitigation reef located between the mean high water line and -5 feet NGVD, and constructed of concrete rubble. The applicant reasons that a "resilient" mitigation reef will more closely compensate for the loss of hard bottom reef that is not subject to seasonal burial. To avoid possible burial of the material, the applicant proposes an alternate site for the "ephemeral" mitigation reef in water depths of -14 feet NGVD. The NMFS does not object to the concept of stratifying the mitigation reefs by depth in order to provide more in-kind mitigation. However, because the majority of the reefs impacted by the project are located in water depths less than -10 feet NGVD, we recommend that the "ephemeral" mitigation reef be located in water depths less than -10 feet NGVD.

In our letter dated April 14, 2000, the NMFS requested information on how temporal losses to hard bottom habitat will be compensated. The Mitigation Plan, dated June 22, 2000, states that "construction of the mitigation reef prior to fill placement will allow for colonization of the reef such that biological productivity of the mitigation reef will be comparable to the impacted reef by the time of project construction". However, the information provided indicates the applicant plans construction of the mitigation reef during the summer of 2000, and with start of construction of the renourishment project around November 2000. It seems doubtful that an artificial reef could be comparable to a natural reef in such a short time. We recommend that either a longer period of time between placement of the mitigation reef and the start of construction be provided, or a higher mitigation ratio, such as 1:5, be considered for temporal loss of the established hard bottom community.

The NMFS is not aware of any conclusive information documenting the value of artificial reefs as compensation for impacts to nearshore reefs from beach renourishment. The monitoring design of the

artificial reefs constructed as mitigation for the renourishment of Juno Beach (COE permit 199706559) was intended to provide information in this regard. We strongly recommend that a monitoring plan be developed for this project that is designed to provide useful information in determining the effectiveness of this type of mitigation reef. In addition to monitoring the mitigation reefs for physical stability and taxonomic lists of species occurrences, ecological comparisons between inshore artificial and natural reefs should be examined for variables such as indices of recruitment for larval/juveniles, predation rates and prey vulnerability, and size structure of fish and selected invertebrates. Similar designs were discussed for the Juno Beach mitigation reefs and we request the results of these analyses be forwarded to the NMFS, when they are available.

To ensure the conservation of EFH and NMFS trust resources, we recommend that the following:

#### **EFH Conservation Recommendations**

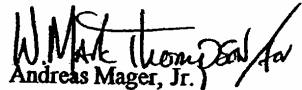
A permit for the proposed beach renourishment activity, as currently proposed, should not be issued. Alternatively, the proposal should be modified as addressed below.

1. To protect hard bottom reefs, a minimum of a 400-foot buffer zone around all borrow areas should be implemented. Acute angles and "dog-leg" features of the borrow site boundaries should be avoided.
2. In order to compensate for unavoidable adverse impacts to hard bottom, coral and other sensitive nearshore habitats, and to compensate for temporal losses to hard bottom habitat, we recommend that either a longer period of time between placement of the mitigation reef and the start of construction, or higher mitigation ratio, such as 1.5:1, be provided for temporal losses of the establish hard bottom community.
3. A monitoring plan should be developed to determine the effectiveness of the proposed artificial reef. In addition to the standard monitoring of physical stability and taxonomic lists of species, the plan should include ecological comparisons to adjacent hard bottom reefs that examine variables such as indices of recruitment for larval/juveniles, predation rates and prey vulnerability, and size structure of fish and selected invertebrates.

Please be advised that the MSFCMA and the regulation to implement the EFH provisions (50 CFR Section 600.920) require your office to provide a written response to this letter. That response must be provided within 30 days and at least 10 days prior to final agency action. A preliminary response is acceptable if final action cannot be completed within 30 days. Your final response must include a description of measures to be required to avoid, mitigate, or offset the adverse impacts of the activity. If your response is inconsistent with our EFH Conservation Recommendations, you must provide an explanation of the reasons for not implementing those recommendations.

If we can be of further assistance, please advise. Related comments, questions or correspondence should be directed to Michael R. Johnson in Miami. He may be contacted at 305-595-8352.

Sincerely,

  
Andreas Mager, Jr.  
Assistant Regional Administrator  
Habitat Conservation Division

cc:  
EPA, WPB  
DEP, WPB  
SAFMC, CHAS  
FFWCC, TALL  
FWS, VERO  
F/SER3  
F/SER4  
F/SER43-Johnson

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